

REMARKS

Favorable reconsideration of this application, in light of the following discussion and in view of the present amendment, is respectfully requested. Claims 1, 5, 8, 11-12, 14-46 have been amended. Claims 2-4, 6-7, 9-10, and 13 have been cancelled. Claims 1, 5, 8, 11-12, and 14-46 are pending and under consideration.

I. Claim Objections

In the Office Action, at page 2, claims 1, 4, 7, 10, 14-15, and 35 were objected to due to informalities.

Claims 1, 14-15, 24 and 35 have been amended in response to these objections. Accordingly, withdrawal of these objections is respectfully requested.

Claims 4, 7, and 10 have been cancelled. Accordingly, withdrawal of these objections is respectfully requested.

II. Claim Rejections Under 35 U.S.C. § 112

In the Office Action, at pages 2-3, claims 4, 7, 10, 12, and 26 were rejected under the second paragraph of 35 U.S.C. § 112 as being indefinite.

Claims 12 and 26 have been amended in response to these rejections. Accordingly, withdrawal of these § 112 rejections is respectfully requested.

Claims 4, 7, and 10 have been cancelled. Accordingly, withdrawal of these § 112 rejections is respectfully requested.

III. Claim Rejections Under 35 U.S.C. § 101

In the Office Action, at page 3, claims 1-13, 16-21, and 24-46 were rejected under 35 U.S.C. § 101 as being drawn to non-statutory subject matter.

Claims 1, 5, 8, 11-12, 16-21, 24-35, and 39-46 have been amended in response to these rejections. Accordingly, withdrawal of these § 101 rejections is respectfully requested.

Claims 36-38 depend either directly or indirectly from claim 35, and include all the features of claim 35, plus additional patentable features. Accordingly, withdrawal of these § 101 rejections is respectfully requested.

Claims 2-4, 6-7, 9-10, and 13 have been cancelled. Accordingly, withdrawal of these § 101 rejections is respectfully requested.

IV. Claim Rejections Under 35 U.S.C. § 103

In the Office Action, at pages 3-12, claims 1-23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Barr et al. in view of Bracewell et al.

Neither Barr et al. nor Bracewell et al. discuss or suggest:

generating a two-dimensional image representing the piston and the valve, using the specification values;

calculating a gap between the piston and the valve in the generated two-dimensional image;

verifying whether or not the calculated gap between the piston and the valve in the generated two-dimensional image is not less than a predetermined value;

and

reading out, after verifying that the gap is not less than the predetermined value, a three-dimensional standard piston model and valve model from a database,

as recited in amended claim 1. In other words, the invention of claim 1 provides for verifying a gap between the piston and valve in a generated two-dimensional image *before* reading out and deforming the three-dimensional piston and valve models. Therefore, an operator can easily verify the minimum requirement to design a piston before performing the time consuming process of creating a three-dimensional model. Also, whether or not the specification values are adequate can be determined before the generation of a three-dimensional model. Thus, a decrease in total processing time for designing a piston is realized. In contrast, both Barr et al. and Bracewell et al. merely disclose three-dimensional models and *do not provide for two-dimensional verification* prior to creating the three-dimensional model. Therefore, neither Barr et al. nor Bracewell et al. discuss or suggest all of the features of the invention of claim 1.

Accordingly, withdrawal of the § 103(a) rejection is respectfully requested.

Claims 11-12 and 16-21 depend from and include all the features of independent claim 1, plus additional features that are not discussed or suggested by the references relied upon. Therefore, claims 11-12 and 16-21 patentably distinguish over the references relied upon for at least the reasons noted above. Accordingly, withdrawal of these § 103(a) rejections is respectfully requested.

Similarly, neither Barr et al. nor Bracewell et al. discuss or suggest all of the features of the inventions of amended claims 5, 8, and 14-15. Accordingly, withdrawal of these § 103(a) rejections is respectfully requested.

Claims 22 and 23 depend from and include all the features of independent claims 14 and 15, respectively, plus additional features that are not discussed or suggested by the references relied upon. Therefore, claims 22 and 23 patentably distinguish over the references relied upon for at least the reasons noted above. Accordingly, withdrawal of these § 103(a) rejections is respectfully requested.

Claims 2-4, 6-7, 9-10, and 13 have been cancelled. Accordingly, withdrawal of these § 103 rejections is respectfully requested.

In the Office Action, at pages 12-19, claims 24-46 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Barr et al.

Barr et al. does not discuss or suggest:

reading out an intake-side piston model having an intake-side recess, and an intake valve mode from a database, which stores a plurality of intake-side piston models and a plurality of exhaust-side piston models, independently, in accordance with crown types of the piston;

deforming the intake-side piston model using the specification values input in the inputting, so as to prevent interference between the intake-side recess and the intake valve model;

further reading out an exhaust-side piston model having an exhaust-side recess, and an exhaust valve mode from the database;

and

further deforming the exhaust-side piston model using the specification values input in the inputting, so as to prevent interference between the exhaust-side recess and the exhaust valve model,

as recited in amended claim 24. In other words, the invention of claim 24 provides for reading out the intake-side piston model and exhaust-side piston model *separately*, and *deforming them independently*. Barr et al. does not discuss or suggest these features of the invention of claim 24, nor would it have been obvious to one skilled in the art at the time to modify Barr et al. in such a manner. Accordingly, withdrawal of the § 103(a) rejection is respectfully requested.

Claims 25-34 depend from and include all the features of independent claim 24, plus additional features that are not discussed or suggested by the reference relied upon. Therefore, claims 25-32 patentably distinguish over the references relied upon for at least the reasons noted above. Accordingly, withdrawal of these § 103(a) rejections is respectfully requested.

Barr et al. does not discuss or suggest:

reading out a main body piston model, which represents a shape

of a surface of the piston, from a database, which stores a plurality of main body piston models and a plurality of space models independently;

deforming the main body piston model using the specification values input in the inputting;

further reading out a space model, which represents a space shape to be carved out from the main body model, from the database;

further deforming the space model using the specification values,

as recited in amended claim 35. In other words, the invention of claim 35 provides for reading out the main body piston model and space model *separately*, and *deforming them independently*. Barr et al. does not discuss or suggest these features of the invention of claim 35, nor would it have been obvious to one skilled in the art at the time to modify Barr et al. in such a manner. Accordingly, withdrawal of the § 103(a) rejection is respectfully requested.

Claims 36-46 depend from and include all the features of independent claim 35, plus additional features that are not discussed or suggested by the reference relied upon. Therefore, claims 36-46 patentably distinguish over the references relied upon for at least the reasons noted above. Accordingly, withdrawal of these § 103(a) rejections is respectfully requested.

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

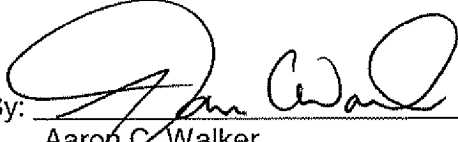
Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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Date: 4-16-07

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